

4D – Public Safety



PUBLIC SAFETY

Public safety is critical to the health of a community, and relates to a variety of hazards. Coastal cities are particularly vulnerable to the risks posed by climate change, and Morro Bay is committed to establishing policies and programs that protect the community from these hazards and ensure long-term resiliency. This element places a specific focus on climate change-related hazards and policies that will prepare the City for future emergency situations, but also includes information on other environmental hazards and emergency response procedures. This element is informed by extensive research on current conditions, and provides tools to address existing and anticipated risks.

OVERVIEW

Scope and Content

The state of California requires that general plans address public safety, with a specific focus on hazard identification and mitigation. Section 65302(g) of the California Government Code specifies the required inclusions for each community's safety element, such as seismic-induced conditions, slope instability that leads to mudslides and landslides, subsidence, liquefaction, flooding, and fire hazards. State law specifies that communities can address additional safety issues that are applicable to each community, including hazardous materials, coastal hazards, and emergency planning. Thus, this chapter also addresses environmental hazards and emergency response plans and responsibilities.

The *Overview* section of this element describes its purpose, how it relates to other planning and emergency management documents, and how it incorporates resiliency into all policies. The *Natural Hazards*, *Coastal Hazards*, and *Emergency Response* sections detail different components of public safety in Morro Bay, and include goals and policies to improve community resilience.

This Public Safety Element meets state general plan law requirements for the safety topic. It also meets Coastal Act requirements for the Local Coastal Program related to coastal hazards and sea level rise.

Relationship to Other Elements

The Public Safety Element identifies both areas that are vulnerable to natural hazards and resiliency strategies to help Morro Bay withstand future climate change impacts. It also details emergency response procedures and responsibilities. These topics overlap with the following other General Plan Elements:

- Land Use: Proposed or planned land uses should be compatible with the hazard areas identified in this element to ensure new development in these zones is resilient to applicable hazards.
- Circulation: Circulation Element goals and policies may interfere with emergency response and evacuation procedures.
- Conservation: Proposed open space areas may be related to hazard zones as determined in the Public Safety Element.
- Community Well-being: Climate change and natural hazards can impact community health and well-being, and policies will need to consider the impacts of the built environment.
- Community Design: The design of buildings and streetscapes will need to consider resiliency and hazard mitigation.

These elements will be closely related as policies and findings in one may affect policies in another.

Relationship to Local Hazard Mitigation Plan

Under the provisions of the federal Disaster Mitigation Act of 2000 and California Government Code Sections 8685.9 and 65302.6, local governments can adopt a local hazard mitigation plan into their safety element. If a community has not done so, the state will only reimburse the community up to 75 percent of eligible costs associated with emergency response and recovery from a specific situation. Communities with a hazard mitigation plan incorporated into their safety element may receive more than 75 percent of eligible costs from the state.

The City of Morro Bay last adopted a Local Hazard Mitigation Plan in 2018 **[Note to City: date to be updated if the LHMP doesn't get adopted this year]**, which was approved by the Federal Emergency Management Agency (FEMA) and is in compliance with the federal Disaster Mitigation Act of 2000. The Morro Bay Local Hazard Mitigation Plan and all subsequent amendments and updates are hereby

incorporated into this Public Safety Element by reference as though they were fully set forth herein. A copy of the Local Hazard Mitigation Plan is on file in the City's Fire Department.

Commented [KK1]: So is the intent on including the LHMP in the LCP?

RESILIENCY APPROACH

California Government Code Section 65302(g)(4) requires jurisdictions to address climate adaptation and resiliency strategies in their safety elements. State requirements to address climate adaptation include preparation of a vulnerability assessment informed by information from applicable federal, state, regional, and local agencies; adaptation and resilience goals and policies informed by the vulnerability assessment; and implementation measures that include but are not limited to the following:

- Viable methods to avoid or minimize climate change impacts associated with new uses of land;
- Location, when feasible, of new essential public facilities outside of at-risk areas;
- Designation of adequate and feasible infrastructure located in an at-risk area;
- Guidelines for working cooperatively with relevant local, regional, state, and federal agencies; and
- Identification of natural infrastructure that may be used in adaptation projects, where feasible.

Cities with an approved local hazard mitigation plan that includes these components can incorporate the plan into their safety element to satisfy this requirement.

Vulnerable Assets

In 2017, the City of Morro Bay completed a Community Vulnerability and Resiliency Assessment that provided a comprehensive overview of existing and historical conditions related to land use, infrastructure, climate change hazards, sea level rise, natural resources, and water quality in Morro Bay. The report identified community vulnerabilities, impacts, and assets, which are summarized in **Table PS-1**. In each vulnerable area, additional damage can be done to natural resources, utility lines, and transportation infrastructure. The entire Community Vulnerability and Resiliency Assessment is provided as **Appendix XX** to *Plan Morro Bay*.



Vulnerability

Degree to which a system is susceptible to injury, damage, or harm (one part—the problematic or detrimental part—of sensitivity).

Resilience

The Rockefeller Foundation defines urban resilience as “the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.”

Adaptability

The ability, competency, or capacity of a system to adapt to climatic stimuli.

For each asset, the City assigned an impact and an adaptive capacity score based on various studies and familiarity with local conditions. The impact score reflects the severity of the effects that the demographic and climate change-related exposures are expected to have on the assets. For each asset and exposure pair, the authors assigned a qualitative assessment of “low,” “moderate,” or “high” by evaluating answers to a series of questions for each asset. The assessment differed for population-related assets by including specific questions about the number of people that could be impacted by the loss of the asset, how severe these impacts would be, and how long they would last.

**Table PS-1:
Natural Hazard Impacts on Vulnerable Assets**

Hazard	Expected Impact	Vulnerable Areas
Tsunami	Flooding, habitat damage	Tsunami inundation zones
Wildfire	Burn damage, health impacts from smoke, decrease in recreational and aesthetic value	Inland agricultural, residential, parks, and open space uses
Geologic and Seismic Events	Earthquakes, liquefaction, subsidence, landslides, ground shaking	Earthquakes hazard zones
Flooding	Soil erosion, harm to agricultural activity, damage to landscaped areas	Buildings and habitat in flood-prone areas
Drought	Loss of habitat diversity, water shortages, decreased population and economic growth	Agricultural, natural, and open space uses
Sea Level Rise ¹	Erosion, inundation, saltwater intrusion, flooding	Beaches, dunes, shoreline, beachfront
Extreme Heat	Reduced foot traffic, decrease in visitors, habitat degradation, health impacts to vulnerable populations	Embarcadero, State Park, estuary, residential areas

¹: Detailed in greater depth in Table PS-2.

This Public Safety Element addresses these potential hazards by analyzing each hazard and its applicability to Morro Bay. It then establishes goals and policies to mitigate or prevent these impacts whenever possible.

Since Morro Bay is a coastal city that will be affected by the impacts of climate change, a second report was prepared describing potential adaptations to sea level rise, with information on current and future risks through 2100. This report found that Morro Bay's beaches, state parks, coastal parcels, and transportation infrastructure were most vulnerable to these impacts. This report provided adaptations for a stretch of Highway 1, the Morro Rock parking lot, and the Embarcadero waterfront, which were some of the most vulnerable assets in need of adaptation strategies. Potential strategies include various forms of natural and man-made shoreline protections, habitat nourishment, and improvements to existing infrastructure to increase resilience to anticipated impacts.

A comprehensive understanding of all existing and anticipated hazards in Morro Bay allows the City to address specific community issues and develop response and mitigation plans for each. These assessments were used to inform policies in this element that focus on resiliency as conditions change on the central coast of California.

SAFETY

Morro Bay is exposed to a range of natural hazards, including wildfires, earthquakes, and risks resulting from sea level rise. The City can foster development strategies that establish plans for and reduce damage from potential hazards.

Natural Hazards

The following natural hazards pose a safety risk in the planning area.

Tsunami



A tsunami is a wave generated by the sudden displacement of a large amount of water. Tsunamis are often triggered by earthquakes, volcanic eruptions, or similar events that occur under the water or the shore. When approaching the shore, waves can travel in excess of 500 miles per hour and exceed 100 feet tall. Their impacts can be both immediate and long-term.



While tsunamis are relatively rare, they pose risks to the entire waterfront commercial area and other low-lying areas of the city. These risks are generally greater in northern portions of Morro Bay, which is directly exposed to the ocean and is not protected by the bay and sandspit. Some residential neighborhoods in northern Morro Bay near

Beachcomber Street lie within the tsunami inundation zone. Between Azure Street and Highway 41, the tsunami inundation zone extends to and includes some of Highway 1; between Highway 41 and the Dynegy power plant site, the inundation zone extends out to Little Morro Creek Road. South of the power plant site, the immediate beach area and the Morro Bay Marina are the main assets in the tsunami inundation zone. The City has an established tsunami response plan to assist with orderly evacuation during and swift recovery from potential tsunami events. **Figure PS-1** below shows the potential tsunami inundation zone in Morro Bay.

**Figure PS-1:
Tsunami Inundation Zone**

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Wildfires



Wildfires are a regular part of the ecosystem in large sections of California, and they have occurred occasionally near Morro Bay. Several parts of Morro Bay lie either within or adjacent to fire hazard zones that vary in severity. Some of these areas have natural ecosystems that allow them to adapt to and/or recover from wildfires. Parts of Morro Bay State Park, agricultural lands, and hillside neighborhoods are most vulnerable to fire risks in Morro Bay. Morro Bay State Park is highly adaptive to wildfires, but still has a moderate-high vulnerability. Agricultural areas and hillside neighborhoods have moderate adaptability and overall moderate-low vulnerability.

While Morro Bay does not have extreme vulnerability to wildfires and some habitats are adaptable, the likelihood of wildfires will be affected by climate change impacts such as temperatures, precipitation levels, and drought. By 2100, Morro Bay is expected to experience 15 percent more wildfires than current conditions. **Figure PS-2** shows current fire hazard severity zones and responsibility areas in Morro Bay. Most of Morro Bay falls within the State Responsibility Area, making the City responsible for fire prevention and suppression in only a small area of the city.

Currently, a small portion of southeastern Morro Bay has very high exposure to wildfires, and the remainder of Morro Bay has low risk. This high-risk area is located near the Morro Bay Estuary, and is an LRA comprising primarily natural land and vegetation. Chaparral vegetation is considered at highest risk for fire; foothill woodland, juniper oak/woodland, and north coast shrub vegetation are also at an elevated risk. Wildfires that burn in this area will cause minimal risk to life or property, since the area is mainly composed of natural land and vegetation, but may damage habitat or cause respiratory problems for people nearby. Wildfire risks are higher in inland San Luis Obispo County, in some cases in close proximity to the city limits.

State Responsibility Area (SRA)

Area where the state of California holds primary financial responsibility of preventing and suppressing fires.

Local Responsibility Area (LRA)

Area where local jurisdiction (Morro Bay) is responsible for fire prevention and suppression.

**Figure PS-2:
Fire Hazard Severity Zones and Responsibility Areas**

Geologic and Seismic Hazards



Geologic and seismic hazards are caused by the movement of the earth's surface. The most familiar of these are earthquakes, which cause the earth's surface to move rapidly and the ground to shake. There are seven seismically active faults that have been identified in San Luis Obispo County and could potentially affect the planning area: the Los Osos Fault, the Hosgri fault, the Oceanic-West Huasna fault, the Rinconada fault, the East Huasna fault, the La Panza fault, and the San Andreas fault. Seismic activity on these faults can trigger other types of hazards, including:

- Surface rupture: The ground cracks due to an earthquake.
- Ground shaking: The passage of seismic waves causes the ground to shake, causing damage to structures.
- Liquefaction: Loose soil loses strength and acts like a liquid during an earthquake, damaging structures built on it.
- Landslides: The shaking of an earthquake causes loose material to slide down a slope.
- Subsidence: The ground surface drops rapidly due to an earthquake.
- Tsunami: Large, fast-moving waves or walls of water that may flood low-lying coastal areas.

Morro Bay has experienced the effects of several seismic events in the past 150 years. The most recent earthquake that impacted Morro Bay was the San Simeon earthquake, which occurred in 2003. Morro Bay experienced some building damage and small fires as a result of the earthquake.

Morro Bay's entire coastline is at high risk for liquefaction, with the exception of the area near Morro Rock. The high-risk areas extend inland in southern Morro Bay, from downtown to Highway 1. Inland neighborhoods in northern Morro Bay have a moderate risk for liquefaction.

Landslide risks in Morro Bay are relatively low, but the risk is higher in the eastern portion of the city. Very small sections of the city near Morro Bay State Park and the estuary are considered very high or high risk. Some residential, commercial, and natural lands east of Highway 1 are considered high risk. These areas include a small neighborhood framed by Downing Street and Highway 1, and a portion of the neighborhood framed by Highway 41 and Highway 1 in northern Morro Bay.

Figures PS-3 through PS-5 identify locations of known geologic and seismic hazards in the planning area.

**Figure PS-3:
Regional Fault Lines**

**Figure PS-4:
Liquefaction Susceptibility**

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**Figure PS-5:
Landslide Susceptibility**

Flood Hazards



Floods can erode soil and plants, harm agricultural activities and landscaped areas, damage utilities, and compound other hazards, such as landslides. Past flooding events in Morro Bay have had minimal impacts on property and residents, but climate change is likely to increase these impacts. At this time, specific changes in degrees of severity, number of flood events, and the size of affected areas remain unknown and are subject to ongoing research.

According to FEMA, the highest risk areas in Morro Bay are coastal areas. These include areas along the coastline and bay, a wide swath of land south of Morro Creek, and parts of northern Morro Bay around Alva Paul Creek. Several agricultural, residential, industrial, and commercial areas are located in floodplains, and are susceptible to risks from 100- and 500-year floods. Several important community assets are located in these areas, including Morro Bay High School, Morro Strand RV Park, and Morro Dunes RV Park. Some residential uses in northern Morro Bay would also be affected by flooding. This flood risk is highest during heavy precipitation that results from narrow bands of warm, moist air.

Morro Bay offers strategies for landowners to reduce flood risks, such as site planning, effective drainage, and low-impact design (LID) strategies.

Figure PS-6 shows areas in the flood zone of Morro Bay.

**Figure PS-6:
FEMA Flood Zones**

Drought



The short-term effects of drought include stress to vegetation and increased risks of wildfires. Droughts also have long-term impacts that affect a community's economic, social, and environmental conditions, due to interference with major revenue sources like tourism and agriculture.

Droughts have happened in cycles throughout Morro Bay's history, but climate change is likely to increase their occurrence. According to the Community Vulnerability and Resilience Assessment, the Central Coast region is expected to see an overall decline of about 3-4 inches of annual precipitation by 2100, increasing the frequency of droughts.

GOALS AND POLICIES

GOAL PS-1: Damage from natural disasters is minimized and repaired quickly.

POLICY PS-1.1: Vulnerable Assets. Examine all vulnerable assets and develop a plan to minimize risks and respond quickly to damage.

POLICY PS-1.2: Emergency Response. Provide adequate warning and evacuation assistance in the event of natural disasters such as a tsunami, flood, and earthquake-related events.

POLICY PS-1.3: Education and Awareness. Provide public information regarding natural hazard risks and resiliency strategies.

POLICY PS-1.4: Climate Change. Consider how climate change impacts may change anticipated hazard conditions when planning for emergency response.

GOAL PS-2: Development is protected from natural disasters to the greatest extent possible.

POLICY PS-2.1: Public Facilities. Maintain the integrity and adaptability of essential public facilities that are vulnerable to natural hazards. When feasible, locate new essential public facilities outside of natural hazard zones.

POLICY PS-2.2: New Development in High-Risk Areas. Require new development to be located outside of areas subject to natural hazards from tsunami, geologic, flood, and wildfire conditions when feasible. If development must occur in such high-risk areas, ensure that it is located and constructed in a manner that minimizes risks to life and property.

Tsunami

POLICY PS-2.3: Warning and Evacuation Assistance. Provide sufficient warning and evacuation assistance to residents and others impacted by flooding and tsunami events.

POLICY PS-2.4: High-Risk Area Identification. Continue to identify tsunami-prone areas and establish development, emergency response, and recovery standards and procedures within these areas.

Wildfires

POLICY PS-2.5: Construction in High-Risk Areas. Require that structures be built in fire defensible spaces and minimize the construction of public facilities in areas of high or very high wildfire risk.

POLICY PS-2.6: New Development in High-Risk Areas. Require new developments in areas of high and very high wildfire risk to incorporate fire-safe building methods and site planning techniques into the development.

POLICY PS-2.7: Plan Consistency. Work with fire districts, other agencies, and property owners to ensure consistency with related plans including the Morro Bay and San Luis Obispo County Emergency Operations Plans, and to coordinate efforts to prevent wildfires and grassfires through fire protection measures such as consolidation of efforts to abate fuel buildup, and access to firefighting equipment and water service.

Geologic and Seismic Hazards

POLICY PS-2.8: Structural Stability. Require new development to ensure structural stability while not creating or contributing to erosion or geologic instability or destruction of the site or surrounding area.

POLICY PS-2.9: New Development in High-Risk Areas. Require that new development in areas subject to liquefaction and/or landslide hazards is located in a manner that will minimize risks to life and property.

POLICY PS-2.10: Building Retrofits. Encourage building retrofits that improve resiliency to geologic and seismic hazards.

POLICY PS-2.11: New Development Proposals. Require new development proposals in seismic hazard areas to consider risks caused by seismic activity and to include project features that minimize these risks.

POLICY PS-2.12: Grading and Cut-and-Fill Operations. Require new development to minimize grading and cut-and-fill operations.

Flood Hazards

POLICY PS-2.13: 100-year Floodplains. Prohibit all development, including construction, excavation, and grading (except for flood control projects and agricultural uses) in the 100-year floodplain areas, unless off-setting improvements in accordance with HUD regulations is required.

Commented [KK2]: What does this mean?

POLICY PS-2.14: Floor Elevations in Flood-Prone Areas. Require development in flood-prone areas within the city to include finished floor elevations 2 feet above the 100-year flood elevation.

POLICY PS-2.15: Storm Drain Capacity. Maintain and increase local storm drain capacity to meet 100-year or greater flood protection requirements to protect residents and businesses from flood risks.

POLICY PS-2.16: Ponding. Identify and manage areas that experience ponding during heavy rain events in order to mitigate future impacts of flooding.

Drought

POLICY PS-2.17: Drought Impact Assessment. Develop a drought impact assessment that examines drought triggers, patterns, and community impacts. Determine methods to minimize risks and respond quickly to impacts.

POLICY PS-2.18: Drought Impact Mitigation. Explore ways to mitigate the impacts of drought, including alternative landscaping and water conservation.

POLICY PS-2.19: Impacts on Tourism. Develop a plan to minimize drought impacts on revenue from tourism, such as weather monitoring and government assistance.

POLICY PS-2.20: Impacts on Agriculture. Develop methods to mitigate and manage the impacts of drought on the agricultural industry, including conservation and incentives to grow less water-intensive crops.

POLICY PS-2.21: Drought Prevention. Strengthen water management and drought prevention efforts by integrating local water management plans and considering water conservation in new development applications.

Coastal Hazards

Sea Level Rise and Inundation



As a community with both bluffs and low-lying areas near the coast, Morro Bay is at risk from two types of coastal hazards. High tides and high surf continually erode coastal bluffs located along the shoreline. This condition is often exacerbated by wind and inadequate drainage practices from development on top of bluffs.

Current science indicates that sea level rise is directly linked to climate change, and is expected to increase over time. An increase in the frequency of intense storms that affect California is one possible effect of climate change, and any such increase would also likely increase erosion through high surf and storm surges. Higher sea levels may increase community vulnerability to hazards such as storm surges and tidal flooding, and may also exacerbate coastal erosion by decreasing the size of protective beaches.

The Morro Bay coastline totals approximately 9 miles of shoreline, including both state and City beach areas. Over time, these impacts will cause inundation from tidal waters to beaches, state parks, private property, and transportation corridors. Beaches and other low-lying portions of the planning area are threatened by sea level rise, a slow but gradual process that may cause average sea levels to increase by as much as 5.5 feet or more by the year 2100. This will result in damage to and displacement of affected parcels.

A vulnerability assessment was published in 2017 to determine the risks for sea level rise in Morro Bay for years 2030, 2050, and 2100. The vulnerability assessment estimated the consequences, probability, and resulting risk from various sea level rise scenarios. Depending on the scenario, additional land near the coast could be subject to varying degrees of shoreline erosion and more extreme storm-related

flooding. These hazards could threaten private buildings, public facilities, roads, and beaches.



The vulnerability assessment used a rating system that classifies impacts as low, moderate, or high. This assessment is performed qualitatively to help the City manage risks related to sea level rise, in order to understand both the risk, and the magnitude and likelihood of associated impacts. This rating system is established by three variables:

amount of exposure, sensitivity to risk, and adaptive capacity. In general, low impacts are those that are either temporary or do not greatly interfere with the functionality of the asset, whereas moderate and high impacts pose a greater threat to its use. Assets that experience moderate impacts have more exposure, but are not completely compromised. High impacts result in long-term and/or permanent damage, and often have limited adaptive capacity.

Both coastal and inland areas face threats from sea level rise. The threat to coastal areas is the result of erosion and flooding from wave run-up (particularly from large waves associated with coastal storms). Sea level rise threatens the inland areas by exacerbating flooding from very high tides, and by contributing to flooding from extreme rainfall events.

Assets Affected



Six major assets in Morro Bay would be affected by sea level rise through 2100. These are summarized as follows. While many of these assets are not immediately threatened, they may become less adaptable and resilient by 2100. Additional resources that have not been quantified but will experience the impacts of sea level rise include environmentally sensitive lands, harbor resources, visual resources, and cultural resources.

Beaches

Sandy beaches in Morro Bay are highly vulnerable to sea level rise impacts due to anticipated erosion and loss of the shoreline. Although sandy beaches are often thought to have high adaptive capacity because they naturally adjust to rising sea level, this can be diminished on beaches that are backed by coastal structures, or do not have enough sand to naturally regenerate. The beach in northern Morro Bay is particularly vulnerable to impacts of sea level rise.

Public Access Ways

Vertical beach access points and lateral access trails that run along the beach and bay are some of the public access ways that may be threatened by inundation from sea level rise. These assets are vulnerable to coastal flooding and erosion that may diminish their quality and usability. For example, erosion of the beach may create a large scarp (or drop-off) at the end of a beach access trail. Access ways can often naturally adapt to increased water levels and erosion, although some minor repair and adaptation measures may be needed. Waterfront access ways on fixed or floating structures will continue to provide access as long as they are located at an elevation above predicted water levels or are able to accommodate increased water levels. Public access points that are inundated will migrate inland, and will require adaptation to maintain safety and accessibility.

State Parks

Morro Bay has multiple state park facilities along the shoreline including parking lots, access points, campgrounds, and a marina. State park facilities are important to the city because they provide economic and recreation value while also providing an important low-cost, visitor-serving amenity with prime access to coastal resources. Erosion, habitat loss, and flooding may affect man-made and natural features and interfere with the functionality of campgrounds and other state park resources.



Coastal Development (Parcels)

Privately held parcels on the coast may be exposed to increased flooding from storms as a result of sea level rise and inundation. Each parcel and building's adaptivity will vary depending on elevation and construction materials. Note that impacts to parcels may not necessarily represent impacts to the physical buildings located on the parcel.

Utilities

Utility assets include facilities necessary to run the city effectively and efficiently since loss of water, sewer, or power would significantly disrupt quality of life for residents. While utilities are usually highly sensitive, the only vulnerable utility in Morro Bay is its current wastewater treatment plant. The wastewater treatment plant site was found to be vulnerable to coastal flooding by the 2100 time horizon. Flooding and erosion may lead to a disruption of service during a large surf event. To mitigate this risk, the current plant is planned for relocation to a site east of Highway 1 which is less vulnerable to sea level rise and inundation.

Roads, Bike, and Pedestrian Access

Transportation infrastructure can be highly vulnerable to sea level rise and inundation that causes significant flooding and erosion events. These events may require substantial maintenance and repair, which may have high costs. Many roadways include bike and pedestrian facilities or have separate bike and pedestrian facilities running parallel to roads.



Table PS-2 shows the vulnerability of different assets to the impacts of sea level rise, as explained further in **Appendix B**.

Table PS-2:
Sea Level Rise Vulnerability in Morro Bay, 2030–2100

Asset	Exposure Risk by Year and Level of Risk		
	2030	2050	2100
Beaches	Low 60 acres	Moderate 68 acres	High 96 acres
Public Access Ways	Low 26,936 linear feet	Low 28,329 linear feet	Moderate 37,052 linear feet
State Parks	Moderate 27 parcels	High 28 parcels	High 33 Parcels
Coastal Development (Parcels)	Low 66 parcels	Moderate 74 parcels	Moderate 133 parcels
Utilities (Wastewater Treatment)	Low	Low	High Coastal flooding, dune erosion
Roads, Bike, and Pedestrian Access	Moderate 2,715 linear feet	Moderate 4,102 linear feet	High 13,162 linear feet

The vulnerability assessment looks forward to 2100 to determine the specific extent of the city's vulnerability to sea level rise, including an inventory of potentially affected assets and their estimated replacement value. Although most of *Plan Morro Bay* looks to the year 2040, the sea level rise assessment identifies vulnerabilities on a much longer horizon for multiple reasons. First, while the assessment relies on the best available science and methods, there is an inherent degree of uncertainty in these projections, meaning sea levels could rise faster or slower than the estimated projections. Second, as current science indicates that sea level rise is a

consequence of climate change, the amount of sea level rise could exceed estimates if the activities that cause climate change end up being greater than expected. Additionally, a building constructed within the horizon of *Plan Morro Bay* may still be used toward the end of the century; thus, it is important to understand potentially hazardous conditions within the planning area in 2100 to cover the life span of a building.

Figure PS-7 shows the potential sea level hazard areas by 2050 in Morro Bay. This figure identifies multiple hazard zones that may have different impacts in different regions of Morro Bay. These include general inundation hazard zones where sea level rise will occur and impact existing infrastructure and resources; flood hazard zones that will be subject to increased flooding; and bluff and dune hazard zones where existing coastal bluffs and dunes that may currently serve as important natural habitat or buffers will experience increased erosion that exceeds their ability to naturally regenerate.

**Figure PS-7:
Potential Sea Level Hazard Areas (2050)**



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Asset Vulnerability and Adaptation



The planning horizon of *Plan Morro Bay* is 2040, although the hazard area reflects areas of potential impact by 2050. This extra time helps ensure that projects proposed near the end of the General Plan horizon will still benefit from increased resiliency to sea level rise for several more years. It also provides a safety margin in the event that future sea level rise is more

severe or occurs more rapidly than anticipated in current modeling, as previously discussed. Policies are designed to address these issues through adaptation and mitigation, and implementation will be tailored to the areas with the highest risk. Adaptation strategies should be phased based on triggers that will mark the need for implementation of an action.

Northern Morro Bay

Neighborhoods in northern Morro Bay through Morro Rock Beach face the highest risks for flooding and dune and bluff erosion. Important assets in this area include the beach, residential neighborhoods, and Morro Bay High School. The Morro Rock parking lot is particularly vulnerable to flooding by 2050. This area will require extensive ongoing maintenance to ensure that increasing water levels do not scour the revetment toe and destabilize the structure. Adaptation options include improving existing revetments, building sand dunes that will provide natural buffers from hazards, or elevating vulnerable areas.

Highway 1

There is one potentially vulnerable low-lying section of Highway 1 that is fronted by a rock revetment just south of Toro Creek Bridge. This section of the highway will become vulnerable to bluff erosion and flooding during extreme storms by the year 2050. Shoreline protection structures do not continue through the entire reach and may not accommodate increased water levels. Adaptation options include improving existing revetments, building sand dunes that will provide natural buffers from hazards, extending existing bridges to elevate the highway, or realigning the highway to the east to avoid hazard areas.

The Embarcadero

While the Embarcadero rests at a high elevation and can endure some sea level rise, the area is subject to potential inundation in higher sea level rise scenarios. Utilities, floating docks, and storm drains may begin to encounter high water level issues by 2050. By 2100, these assets will be fully vulnerable and the entire Embarcadero area

will experience water levels approaching roadway elevations. The area currently has revetment and bulkhead walls, but these structures will need to be maintained and improved to ensure resiliency to sea level rise. To adapt to the most extreme sea level rise estimates, the waterfront may need to be elevated to protect infrastructure and resources from sea level rise. However, this is unlikely to occur within the planning horizon.

Morro Bay State Park

The western oceanfront side of Morro Bay State Park is subject to increased flood and dune hazards by 2050, which could impact the City's tourism revenue and impact valuable natural resources.

Erosion



Erosion occurs when beach and dune environments are worn away or removed by wave action, such as tidal currents, drainage, or high winds. This can be a result of multiple natural occurrences, most of which are related to sea level rise, including extreme storm conditions and flooding. Erosion is driven by natural processes, but can be exacerbated by human activities such as shoreline hardening, dredging, and the placement of coastal structures.

Under existing conditions, beaches and dunes are at highest risk for the impacts of erosion. Once these resources have eroded, they take longer to reestablish and are generally less resilient to future conditions. This results in an overall loss of beach area, which will impact recreational opportunities and degrade natural buffers that protect roadways, residential parcels, and commercial parcels as erosion progresses inland. These changes will also affect natural habitats as salinity and nutrient levels change.

In central Morro Bay, erosion risks are lower, as wide beaches and tall sand dunes will protect the community from erosion. Northern Morro Bay is directly exposed to the ocean, and has a higher risk. Currently, beach environments that are eroded from storms are generally replenished during the summer, but sea level rise may change the environment's ability to recover from erosion.

GOALS AND POLICIES

Goal PS-3: Morro Bay is prepared for and responsive to the effects of sea level rise in the near and distant future.

POLICY PS-3.1: Asset Protection. Preserve and protect assets in Morro Bay that are subject to sea level rise, including but not limited to Morro Rock, Highway 1, and the Embarcadero. Coordinate with other agencies whose assets will become vulnerable to sea level rise, and develop and participate in regional plans to address shared asset protection.

POLICY PS-3.2: Adaptation Triggers. Utilize phasing strategies to implement asset protection plans. Base these phasing strategies on triggers that will require implementation of different phases of the plan.

POLICY PS-3.3: Monitor Beaches. Monitor beaches for sea level rise impacts such as erosion and changes in beach widths in order to identify trigger points for various adaptation strategies.

POLICY PS-3.4: Shoreline Management Plan. Prepare a shoreline management plan that addresses vulnerabilities due to coastal flooding through long- and short-term goals.

POLICY PS-3.5: Shoreline Protection Structures. Maintain existing shoreline protection structures (including prioritized revetments) as the coastline changes.

POLICY PS-3.6: Scientific Evidence. Remain aware of the best available science on sea level rise.

POLICY PS-3.7: Property Owner Information. Provide information to property owners about the risks associated with coastal erosion and flooding and encourage them to take adequate steps to prepare for these risks.

POLICY PS-3.8: Site Reuse. Consider appropriate uses for sites previously occupied by relocated assets, including parks, open space/natural areas, and other predominantly passive land uses.

GOAL PS-4: New development is sensitive to the anticipated impacts of sea level rise.

POLICY PS-4.1: Sea Level Rise Hazard Overlay Zone. Promote appropriate development patterns in areas identified in potential sea level rise hazard areas established in **Figure PS-7** through a Sea Level Rise Hazard Overlay Zone.

POLICY PS-4.2: Transfer of Development Rights (TDR). Consider a TDR program to restrict development in areas that are vulnerable to sea level rise and allow the transfer of development rights to parcels with less vulnerability to hazards.

POLICY PS-4.3: Bluff and Coastal Erosion. Encourage development patterns that will not exacerbate bluff or coastal erosion.

POLICY PS-4.4: Sea Level Rise Mitigation. Require new development and redevelopment projects to consider sea level rise mitigation in their plans.

POLICY PS-4.5: Resilient Infrastructure. Consider coastal resiliency strategies when maintaining or replacing existing infrastructure.

POLICY PS-4.6: Public Improvements. Increase the City's understanding and funding for public improvements with respect to potential vulnerabilities and impacts to infrastructure associated with changes in sea level elevation.

Emergency Response

The Morro Bay Fire Department is responsible for coordinating emergency preparedness in the planning area, and several other agencies hold responsibility for different types of hazards. The Fire Department coordinates with the San Luis Obispo County Office of Emergency Services and Region I of the California Office of Emergency Services to develop programs to ensure disaster preparedness.

City of Morro Bay Multi-Hazard Emergency Response Plan

The City cannot completely eliminate all disasters, but the City's adopted Multi-Hazard Emergency Response Plan can reduce exposure risks by providing plans for retrofitting and engineering improvements as well as education. Since almost all major emergencies result in response from more than one agency, the program development and emergency incident response in this plan is coordinated with surrounding jurisdictions. The plan covers the City's response to events including natural hazards, hazardous materials emergencies, multi-casualty events, civil disturbances/acts of terrorism, nuclear power plant emergencies, and tsunamis.

Natural Hazards

As described above, Morro Bay is vulnerable to several different natural hazards, including earthquakes, flooding, wildfires, and tsunamis. In the event of an earthquake, wildfire, or tsunami, the Fire Department assumes the primary role for emergency response. In the event of a storm that causes flooding, the Public Services Department is the primary responder in the management of the emergency. In some more severe circumstances, out-of-city assistance may be delayed by more than 72 hours.

Hazardous Materials

Hazardous materials are substances that may cause harm to life or the environment. Incidents involving hazardous materials are considered emergencies, and may occur at fixed facilities or transportation routes. Morro Bay has two major transportation routes that transport hazardous materials: Highway 1 and Highway 41. These routes transport thousands of tons of hazardous materials every year from locations throughout the state. There is little concern over hazardous materials being transported through the air near Morro Bay, as there are no major airports. The waterfront area of Morro Bay includes fixed facilities that store the majority of chemicals and pesticides in the city. There is a relatively low risk of incidents involving transport of hazardous materials in Morro Bay, but they would be most likely to occur on major transportation routes. In the event of an emergency involving

hazardous materials, there is potential for extreme risk to life and property. The Morro Bay Fire Department is responsible for the management of emergencies involving hazardous materials.

Multi-Casualty Incidents

A multi-casualty incident is an event that results in a large number of injured persons or casualties, or the evacuation of a medical facility, as a consequence of any natural or man-made disaster. Multi-casualty event risks in Morro Bay include those related to transportation, surf conditions, and large public events. These events are typically managed by the Fire Department and any party responsible for the event.

Civil Disturbance

A civil disturbance is a large outbreak of disorderly conduct. These pose risks to law enforcement and safety personnel. Their highest risk is during high-density events, such as the Morro Bay Harbor Festival, which can host as many as 20,000 people at a time. The Police Department assumes the primary role in the management of a civil disturbance.

Terrorism

Terrorist actions may include biological, chemical, incendiary, explosive, nuclear/radiological, or electronic attacks. The likelihood of terrorist attacks is lower in low-population regions such as San Luis Obispo County. The Police Department assumes the primary role in the management of a terrorism event.

Nuclear Power Plant Emergencies

The Diablo Canyon Nuclear Power Plant is operated by the Pacific Gas and Electric Company (PG&E), and is located approximately 10 miles south of Morro Bay. The plant consists of two nuclear power-generating units that have the capacity to generate power in excess of 1,000 megawatts. The probability of a nuclear accident is very low, and is prevented through conservative design, construction, and operation. Protective systems are installed and emergency plans are in place in the event that any part of the reactor system fails. Diablo Canyon is scheduled to be decommissioned in 2025. The Fire Department assumes the primary role in the management of a nuclear emergency. **Figure PS-8** shows Nuclear Emergency Planning Zones around Morro Bay.

Morro Bay is located beyond the federally defined Nuclear Emergency Planning Zone that surrounds Diablo Canyon. However, **Figure PS-8** shows that Morro Bay is located in Preparation Action Zone (PAZ) 9. PAZs are California's recently expanded emergency planning zones. Due to its distance from the power plant, only the most severe nuclear emergency would pose a threat to Morro Bay. While the risk is low, severe nuclear emergencies may require Morro Bay residents to evacuate or shelter in place.

**Figure PS-8:
Nuclear Emergency Planning Zones**

Evacuation Routes

In the event of a natural or environmental disaster, the community will follow evacuation procedures identified by the appropriate emergency respondent (such as Policy, Fire, or Public Services Department).

Peak Load Water Supply

Water supply in the planning area may be impacted by climate change. Water demand and costs are expected to increase during the planning period, which would require alternative water sources. Morro Bay's water issues are addressed by an Urban Water Management Plan, the Morro Bay Stormwater Management Plan, and the Morro Bay Sewer Management Plan. These plans are currently being developed into the One Water Plan, which will address all of these issues and provide policy guidance on water supply, including peak load supplies needed to support firefighting and in times of emergency.

GOALS AND POLICIES

Goal PS-5: Response to emergencies is quick, efficient, and effective.

POLICY PS-5.1: Update Emergency Response Plan. Regularly update the Morro Bay Emergency Response Plan with updated evacuation routes and hazard information. Publicize evacuation routes and other relevant emergency procedures.

POLICY PS-5.2: Hazardous Waste Transportation Routes. Identify and establish specific routes for transporting hazardous materials and wastes. Consider avoiding residential areas, instead using state divided highways as preferred routes.

POLICY PS-5.3: Use, Storage, and Transportation of Hazardous Materials. Require businesses that use, store, or transport hazardous materials to take adequate measures to protect public health and safety. Restrict access to these materials through setbacks and other measures.

POLICY PS-5.4: Interagency Cooperation. Work cooperatively with public agencies with responsibility for natural and environmental hazards.

POLICY PS-5.5: Transportation Requirements. Establish minimum road widths and clearances around structures to improve transportation in the event of an emergency.

POLICY PS-5.6: Resiliency Hubs. Work with local schools and community centers to create “resiliency hubs” that can serve as gathering places during emergencies and interruptions in services, and contain access to water, electricity, and other needed services.

POLICY PS-5.7: Passive Resiliency. Ensure, to the greatest extent possible, that new and significantly remodeled buildings will maintain livable conditions in the event of extended loss of power or heating.

Here are some overall comments from me and Kelsey on this hazards chapter. Overall, while there are definitely some good concepts articulated, I think the biggest issue with the policies so far is that they just lack detail on how they would be implemented (e.g., what does it mean to “consider sea level rise mitigation” when planning new development, or to “consider coastal resiliency strategies” when maintaining or replacing existing infrastructure (pg. 4-100)?). Some other comments:

- 1) We shouldn’t separate out the SLR-related policies from the flooding policies. Ideally, the info section on flooding (pg. 4-85) and the flooding policies (pg. 4-89) be moved to a single section on coastal hazards that also includes erosion and the combined impacts associated with sea level rise. For example, Policy PS-1.1 talks about examining “all vulnerable assets” and developing a plan to minimize risks – is this just for currently vulnerable assets, or does it include assets we know will be vulnerable to future SLR? Policy PS-2.1 and 2.13 refer to locating new development outside of hazards zones and outside of 100-year floodplain areas, but again it is unclear if this just means the currently hazardous areas, or if it refers to locating development so that it will avoid hazards over its anticipated lifetime.
- 2) The policies appear to be mostly disconnected from the work done on the adaptation report and it’s mostly unclear what the direction for adaptation really is. There is some direction in these policies about developing a shoreline management plan (PS-3.4) and utilizing adaptation triggers (PS-3.2), but no real detail on exactly what would be implemented through these.
- 3) Some specific comments:
 - a. Pgs. 4-72 – 4-73: This section refers to the (soon to be adopted) LHMP being incorporated into the Public Safety Element by reference, but it’s unclear that the mitigation actions and recommendations are consistent with Coastal Act policies (one major potential source of conflict would be how/if seawalls and armoring are described and/or encouraged in the LHMP). We would recommend deleting this reference, or having it be subordinate to the LCP.
 - b. Pg. 4-85: talks about climate change related changes to flooding. I would clarify that although it is still unknown the extent to which the number and severity of storm events might change, SLR is an important climate change impact that we do know will result in increased flooding.

- c. Pgs. 4-90 – 4-4-98The SLR section currently describes the effects of SLR on inundation, then has a section on assets affected, then has a section on erosion. I recommend rearranging this so that all the impacts associated with SLR are described first (both inundation and erosion, as well as the combined effects of erosion resulting in increased inundation of beaches and other low-lying areas) and the a single section on the assets affected by all of these.
- d. Pg. 4-95 includes a placeholder for a year 2050 SLR map. It is very important to also include a year 2100 SLR map so as to provide context (and risk disclosure) for new development (which will still be around beyond 2050. And make sure the maps clearly include the amount of SLR that is shown.
- e. Pg. 4-99, Policy PS-3.1 refers to asset “protection”, but the use of “protection” here is sort of problematic. What does protection really mean? Using armoring to protect assets in place? This may be appropriate along the Embarcadero, and even along Hwy. 1 and Morro Rock for at least some amount of time, but over the long term, protecting Hwy 1 in place may result in the loss of the fronting beach. This ties back in with the adaptation direction for these different areas/assets, and what are the steps to get there in order to preserve the benefits these assets provide.

4) Some missing policies that should be included (and please also look to the Sea Level Rise Policy Guidance and the draft Residential Adaptation Guidance)

- a. Policy (or at least clarification from the current policies) regarding siting new development to avoid hazards over the anticipated lifetime of the development
- b. Policy regarding using best available science to identify hazards for siting and design purposes
- c. Assumption of risk and disclosure policies for development in hazardous areas
- d. Additional policies on shoreline armoring (though I recognize that the context along the Embarcadero is somewhat different than other places and may mean some more nuanced policies): general language related to the Coastal Act requirements; repair and maintenance requirements; evaluation of existing armoring; armoring duration; mitigation for armoring; monitoring.

Here are some policies for inclusion regarding coastal hazards, including to address the issues identified above:

The City shall continue to gather information on the effects of sea level rise and other coastal hazards on Morro Bay’s shoreline, including identifying the most vulnerable areas, structures, facilities, and resources, specifically areas with priority uses such as public access and recreation resources, Environmentally Sensitive Habitat Areas, and existing and planned sites for public infrastructure. Updates to the LCP, including via a Shoreline Management

Plan and through any vulnerability assessment, shall use the best available science, including the best available scientific estimates of expected sea level rise and potential resultant impacts. The information gathered shall be based on multiple time frame horizons (e.g., 2025, 2050, and 2100) as well as multiple sea level rise scenarios, as appropriate and feasible.

Commented [KK3]: The Shoreline Management Plan concept piggy-backs on the idea that a more nuanced strategy for MB's coast be developed, where the LCP identifies the general policies and informs where the specific Shoreline Management Plan should go and address.

Based on the information gathered over time, the City shall evaluate whether additional policies and other actions for inclusion in the Local Coastal Program are necessary in order to better address the impacts of sea level rise and other coastal hazards, particularly those related to erosion.

As applicable, such periodic evaluations may result in Local Coastal Program changes to hazard policies designed to:

- a. require relocation of existing or planned development, including development already protected by shoreline protective devices, to safer locations and restoring shoreline areas to natural conditions if feasible, including working with entities that plan or operate infrastructure;
- b. modify allowable land uses in hazardous areas, and modify siting and design standards for development, to avoid and minimize risks and better protect coastal resources;
- c. better protect wetlands and Environmentally Sensitive Habitat Areas;
- d. update standards for determining erosion rates;
- e. ensure long term protection of the function and connectivity of existing public recreational access facilities and resources; and
- f. require modifications to existing shoreline protective devices to ensure that such devices are meeting current standards and are functioning in a way that has the least impact on coastal resources as possible, including evaluation of possible removal and shoreline restoration.

The City shall maintain a warning system and procedures for protection of life and property in coastal areas that are subject to storm and tsunami hazard, including informing visitors to the shoreline of the potential danger of large waves. Development subject to tsunami hazards shall prepare a tsunami preparedness plan that describes evacuation procedures and other protocols for addressing a potential tsunami event.

The Shoreline Management Plan, when updated and approved by the Coastal Commission as an amendment to the Local Coastal Program, shall function as a tool to help implement coastal protections, maximize public access, and protect coastal resources along the City's shoreline. The City shall prepare a sea level rise adaptation program in coordination with

relevant local, regional, and/or state agencies for the purpose of protecting coastal resources, as well as coastal circulation and utility infrastructure as part of the *Shoreline Management Plan* update. The sea level rise adaptation program shall address the need to protect coastal resources, maximize public access, and maintain adequate evacuation routes. Possible adaptation strategies could include but are not limited to:

1. Require existing or planned development, including development already protected by shoreline protective devices, to relocate to safer locations within the Coastal Zone, and restore shoreline areas to natural conditions if feasible, including working with entities that plan or operate infrastructure;
2. Modify land uses allowed in hazardous areas, and modify siting and design standards for development, in order to avoid and minimize risks and better protect coastal resources;
3. Protection of wetlands and Environmentally Sensitive Habitat Areas;
4. Update standards for determining erosion rates;
5. Realignment and elevation to ensure long term protection of the function and connectivity of existing public access and recreation resources; and
6. Require modifications to existing shoreline protective devices to ensure that such devices are meeting current standards and are functioning in a way that has the least impact on coastal resources as possible, including evaluation of possible removal and shoreline restoration

The *Shoreline Management Plan* may be amended from time to time, as appropriate, by the City Council, and adopted by the Coastal Commission through the Local Coastal Program amendment process.

Development shall minimize risks to life and property in areas of high geologic, flood, and fire hazard. Development shall also assure stability and structural integrity, shall not create nor contribute significantly to erosion, geologic instability, or destruction of the site, and shall not substantially alter natural landforms, including as described below.

Development shall be sited and designed to avoid impacts from coastal hazards, including but not limited to, erosion, episodic and long-term shoreline retreat, flooding, inundation, storm waves, high seas, tidal scour, and tsunamis, including in relation to sea level rise, over the life of the development. Development shall be prohibited from using or requiring shoreline protective devices (including, but not limited to, seawalls,

Commented [KK4]: Let's definitely discuss a more nuanced set of policies for the Embarcadero, which is a working waterfront subject to a different standard than the rest of MB's coast. Please keep in mind that the policies in this section don't necessarily apply to the waterfront. We can develop some Embarcadero-specific policies addressing armoring there subsequently.

revetments, breakwaters, groins, bluff retention devices, and piers/caisson foundation systems) at any point during the development's life. As a condition of approval for all coastal development that at some point during its lifetime may be subject to coastal hazards the Applicant shall record a deed restriction against the properties involved in the application acknowledging that the development site may be subject to coastal hazards, acknowledging that shoreline protective devices are prohibited to protect such development, waiving any right that may exist to construct such devices, and agreeing to remove threatened development and restore affected areas if necessary in the future subject to the requirement to prepare a removal and restoration plan, all of which shall also be added as conditions of any approval.

Development proposed in potential hazard areas, including those that are mapped as hazardous, shall be evaluated for potential coastal hazards at the site, based on all readily available information and the best available science. If the initial evaluation determines that the proposed development may be subject to coastal hazards over its lifetime, a site specific hazards report prepared by a qualified geologist/engineer is required, the purpose of which is to ensure that such development can be built in a manner consistent with applicable Local Coastal Program coastal hazards policies.

The Morro Bay shoreline is an irreplaceable resource and its preservation as a natural living shoreline is a matter of great public importance. Therefore, the intent of the Local Coastal Program is to ensure that shoreline protective devices and other shoreline altering development are only utilized in very rare situations and only when all coastal resource impacts are appropriately and proportionately mitigated, including consistent with the policies listed in this section.

Repair and maintenance of existing legally established shoreline protective devices (including restacking dislodged rock rip-rap in revetments within the approved revetment profile and texturing/contouring a vertical seawall per the approved surface treatment, but not including replacement, augmentation, addition or expansion) shall only be allowed if the shoreline protective device is required to protect an existing structure in critical danger from erosion (i.e., when the development would be unsafe to use or occupy within two or three years). If it is not so required, then the shoreline protective device shall be removed and the affected area restored. Any such allowable repair and maintenance projects shall include measures to address

and mitigate for any coastal resource impacts the device is having, including with respect to public views and public recreational access.

New shoreline protective device development (including replacement, augmentation, addition and expansion associated with an existing device) shall only be allowed where required to protect existing development in critical danger from erosion (i.e., when the development would be unsafe to use or occupy within two or three years). Such devices shall only be utilized if no other feasible, less environmentally damaging alternative, including removal or relocation away from such hazards, beach nourishment, non-structural drainage and native landscape improvements, or other similar non-structural options can be used to address erosion hazards. Such non-structural options shall be used and prioritized wherever possible to protect coastal resources, including coastal habitats, public recreational uses, and public access to the coast.

Where such non-structural options are not feasible in whole or in part, soft structural alternatives (e.g., sand bags, vegetation, etc.) shall be used and prioritized wherever possible before more significant shoreline protective devices (including, but not limited to, seawalls, revetments, breakwaters, groins, bluff retention devices, and piers/caisson foundation systems). Shoreline protective devices shall not be constructed where other measures can adequately mitigate erosion hazards. All construction associated with shoreline protective devices and repair or maintenance or augmentation of existing protection devices shall be designed to eliminate or mitigate adverse impacts to geological, biological, cultural and visual resources.

New shoreline protective devices shall be sited and designed to avoid coastal resource impacts to the maximum extent feasible, including through: eliminating or mitigating all adverse impacts on local shoreline sand supply (including sand and beach area that are lost through the shoreline protective device's physical encroachment on a beach, fixing of the back beach, and prevention of new beach formation in areas where the bluff/shoreline would have otherwise naturally eroded, and the loss of sand-generating bluff/shoreline materials that would have entered the sand supply system absent the device); protecting and enhancing public recreational access; protecting and enhancing public views; minimizing alteration of, and being visually subordinate to, the natural character of the shoreline; avoiding impacts to archeological resources; and protecting other coastal resources as much as possible. Shoreline protective devices shall be required to mitigate impacts to shoreline sand supply, public access and recreation, and any other relevant

coastal resource impacts in 20-year increments, starting with the building permit completion certification date. Permittees shall apply for a coastal permit amendment prior to expiration of each 20-year mitigation period, proposing mitigation for coastal resource impacts associated with retention of the shoreline protective device beyond the preceding 20-year mitigation period, and such application shall include consideration of alternative feasible mitigation measures in which the permittee can modify the shoreline protective device to lessen its impacts on coastal resources.

Development that is associated with and/or protected by existing shoreline protective devices shall be required to provide an assessment of the continued efficacy of such devices, including an evaluation of whether the devices can be removed or modified (and affected areas restored to natural conditions) in light of the development proposed (e.g., if the development is being relocated inland) to better protect coastal resources, including critically in terms of public recreational access resources, while still providing necessary coastal hazard protection. If the assessment indicates that they can be so removed or modified, including if the assessment indicates that there is greater coastal resource benefit to removal or modification of the shoreline protective device, then the removal or modification shall be required as a condition of any approval for the development. In all cases, shoreline protective devices shall only be authorized until the time when the qualifying development that is protected by such a device is no longer present and/or no longer requires armoring.

Definitions:

Coastal hazard: Including, but not limited to, episodic and long-term shoreline retreat and coastal erosion, high seas, ocean waves, storms, tsunamis, coastal flooding, landslides, bluff and geologic instability, and the interaction of same, and all as impacted by sea level rise.

Major structural components: The components that hold a structure upright, including the foundation, floor framing, exterior wall framing and roof framing of a structure.

Redevelopment: A structure shall be considered redeveloped, whereby the structure is no longer considered an existing structure and instead the entire structure and all development on the site must be made to conform with all applicable LCP policies, when such development consists of:

- 1) Alteration (including interior and/or exterior remodeling and renovations, demolition or partial demolition, etc.) of 50% or more of the major

structural components (including exterior walls, floor and roof structure, and foundation, of such development.

- 2) Additions and alterations to such development that lead to more than a 50% increase in floor area for the development.

Changes to floor area and individual major structural components are measured cumulatively over time from January 1, 1977.

Shoreline protective device: A broad term for constructed features such as seawalls, revetments, riprap, earthen berms, cave fills, deep piers/caissons, and bulkheads that block the landward retreat of the shoreline and are used to protect structures or other features from erosion and other hazards.